查询SM5812-005-A-3-L供应商

SILICON MICROSTRUCTURES INCORPORATED

SM5812/SM5852
Amplified Pressure Sensor

- ***NOW WITH ACCESS TO DIGITAL TEMPERATURE AND CORRECTED DIGITAL PRESSURE***
- ***LOW-COST, FULLY AMPLIFIED, CALIBRATED, AND COMPENSATED IN A SINGLE PACKAGE***
- ***AVAILABLE FOR DIFFERENTIAL, SINGLE-ENDED DIFFERENTIAL, GAGE & ABSOLUTE APPLICATIONS***
- ***MULTIPLE PRESSURE RANGES AVAILABLE TO MEASURE PRESSURE DOWN TO 0.15 PSI FULL-SCALE AND UP TO 100 PSI FULL-SCALE***

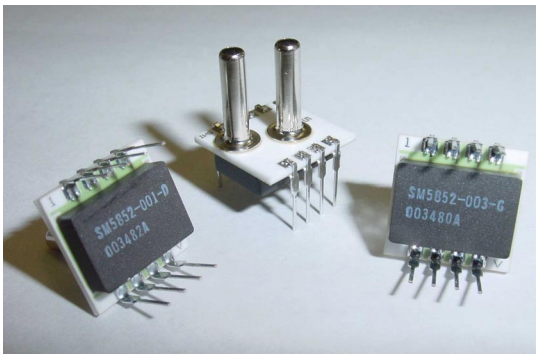
DESCRIPTION

The Silicon Microstructures **SM5812** and **SM5852** series of OEM pressure sensors combines state-of-the-art pressure sensor technology with CMOS digital signal processing technology to produce an amplified, fully conditioned, multi-order pressure and temperature compensated sensor in a dual in-line package (DIP) configuration.

Combining the pressure sensor with a custom signal conditioning ASIC in a single package simplifies the use of advanced silicon micromachined pressure sensors. Now, the pressure sensor can be mounted directly to a standard printed circuit board and an amplified, high level, calibrated pressure signal can be acquired from the digital interface or analog output. This eliminates the need of additional circuitry, such as a compensation network or micro-controller containing a custom correction algorithm.

The **SM5812/SM5852** Series pressure sensors are based on SMI's highly stable, piezoresistive pressure sensor chips mounted on a ceramic substrate. An electronically programmable ASIC is contained in the same package to provide calibration and temperature compensation.

The model **SM5812** is designed for operating pressure ranges from 0-5 PSI up to 0-100 PSI. The model **SM5852** is designed for operating pressure ranges from 0-0.15 PSI up to 0-3 PSI. For both models, the sensor output is ratiometric with the supply voltage.



FEATURES

- Amplified, calibrated, fully signal conditioned output span of 4.0 VDC FS (0.5 to 4.5 V signal)
- Digital temperature and calibrated pressure available through I^2C interface
- Output ratiometric with supply voltage
- Multi-order correction for pressure non-linearity (factory programmed)
- Multi-order correction for temperature coefficient of span and offset (factory programmed)
- Gage, differential, and absolute versions
- SMI's unique low-pressure die allows for a full-scale pressure range of 0-0.15 PSI

TYPICAL APPLICATIONS

- Barometric measurement
- Medical instrumentation
- Pneumatic control
- Gas flow
- Respirators and ventilators
- Heating, Ventilation and Air Conditioning (HVAC)

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THEORY OF OPERATION

The operation of the signal processor is depicted in the block diagram below. The external pressure sensor is a piezoresistive bridge. This transduces the applied pressure into an electronic signal, which is then inputted into the integrating amplifier of the ASIC.

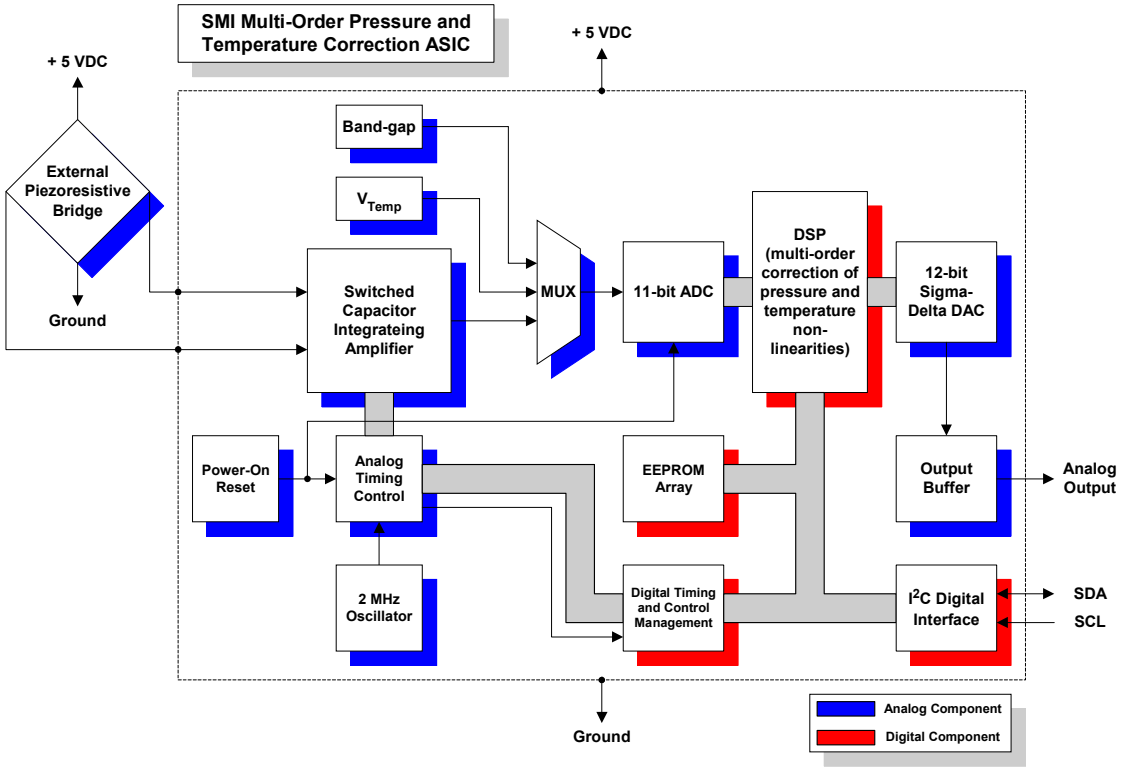
During the amplification step an offset correction factor is added in order to allow maximum gain for a given pressure while minimizing the offset error.

The signal is then passed to an 11-bit analog to digital converter (ADC). The ADC samples the signal multiple times and uses the sum of those samples as a 13-bit word.

A digital signal processor (DSP) is then used to correct and calibrate the pressure signal. The DSP provides multi-order correction of both pressure and temperature non-linearity through the use of factory-programmed coefficients. A combined total of twenty coefficients are available for correcting pressure and temperature non-linearity. The unique coefficients are determined during a calibration process performed at the factory. Factory calibration is the last step performed which means the effect of the package on the pressure signal will also be taken into account. This provides a great advantage over conventional laser-trimming approaches.

The DSP outputs a corrected digital word, which travels to a 12-bit digital to analog converter (DAC) to provide a calibrated analog output. In addition to the analog output, the corrected pressure signal is accessible through an I^2C digital interface.

See SMI application note AN05-001 for a detailed description of how to read out the digital corrected pressure signal using the I2C bus interface.



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CHARACTERISTICS FOR SM5812/SM5852 – *SPECIFICATIONS*

All parameters are measured at room temperature while applying 5.000V supply, unless otherwise specified.

	Absolute[1], Gage & Single[2]			Differential				
	MIN	TYP	MAX	MIN	TYP	MAX	UNITS	NOTES
Zero output (absolute and gauge)	0.42	0.50	0.58				V	3
Zero output (differential)				2.42	2.50	2.58	V	3
Output Span	3.92	4.00	4.08	1.96	2.00	2.04	V FS	3, 4
0.15 PSI	3.80	4.00	4.20	1.90	2.00	2.10	V FS	3, 4
Linearity	-0.5		+0.5	-0.5		+0.5	%FS	5
0.15 PSI	-2.5		+2.5	-2.5		+2.5	%FS	5
Pressure hysteresis 5812	-0.1		+0.1	-0.1		+0.1	%FS	
5852	-0.3		+0.3	-0.3		+0.3	%FS	
Temperature coefficient - Zero	-1.0		+1.0	-1.0		+1.0	%FS	
0.15 PSI	-2.5		+2.5	-2.5		+2.5	%FS	
Temperature coefficient – Span	-1.0		+1.0	-1.0		+1.0	%FS	
0.15 PSI	-2.0		+2.0	-2.0		+2.0	%FS	
Thermal hysteresis	-0.1		+0.1	-0.1		+0.1	%FS	
Response Time	2			2			msec	
Supply voltage	4.75	5.00	5.25	4.75	5.00	5.25	V	3, 7
Current consumption			10			10	mA	
Overpressure 5812	3X			3X			%FS	6
5852	15X			15X			%FS	6
Operating temperature range	-40	25	+125	-40	25	+125	°C	
Compensated temperature range	0	25	+70	0	25	+70	°C	
Storage temperature range	-55	25	+135	-55	25	+135	°C	
Media compatibility								8
Weight		3			3		gram	

Notes:

1. Absolute parts are only offered in the SM5812 Series.
2. Single-ended parts (Pressure Type - S) have 2 ports and are for higher gain differential applications where the differential pressure is **always** positive.
3. Sensor output is ratiometric to supply.
4. Full-scale (FS) is defined as zero pressure to rated pressure; differential parts can be used ±FS. Absolute and Gauge zero output is 0.5 V typical and full-scale output is 4.5 V. Span is the difference between Full-scale output and zero output, (4 V). For Differential parts, the negative full-scale is typically at 0.5 V, zero is typically 2.5 V, and positive full-scale is 4.5 volts to give a span of ±2.0 V.
5. Defined as best fit straight line for positive pressure applied to the part
6. Or 225 PSI, whichever is less. Output amplifier will saturate at about 0.25 V for applied pressure below the rated Zero and at about 4.75 V for applied pressure above the rated Full-scale.
7. A 100 nF filter capacitor must be placed between Vsupply and Ground.
8. Clean, dry gas compatible with wetted materials. Wetted materials include Pyrex glass, silicon, alumina ceramic, epoxy, RTV, gold, aluminum, and nickel.

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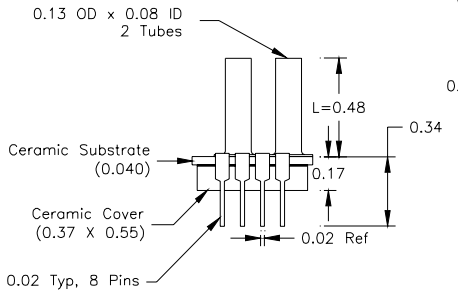
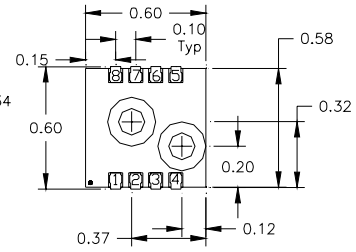
ADDITIONAL INFORMATION

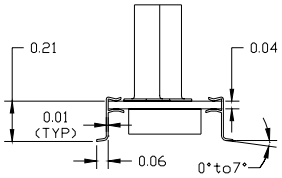
Package Dimensions & Pin-Out

Dual Inline Pin (DIP) Option



Pin Numbers
(for both DIP & Surface Mount)





Surface Mountable Pin Option

PIN	DESCRIPTION
1	NC
2	**GROUND**
3	NC
4	**SERIAL DATA (SDA)**
5	**SERIAL CLOCK (SCL)**
6	NC
7	**V_{exc} = 5.000 VDC**
8	**ANALOG OUTPUT**

NOTES:
- Do **not** connect to NC pins.
- External connections to NC pins will cause part malfunction.
- All dimensions are shown in inches.
- Tolerance on all dimensions +0.005" unless otherwise specified.

Ordering Information

Pin Configuration
3 : DIP pins, opposite direction of tubes
5 : Surface mountable pins, opposite direction of tubes

Tube Length
L : Long (0.480" ± 0.005")
N : No tube

Pressure Type
A : Absolute (1 port)
D : Differential (2 ports)
G : Gauge (1 port)
S : Single-ended (2 ports)

Model Number | **Pin Configuration**

SM5852 - 003 - D - 3 - L

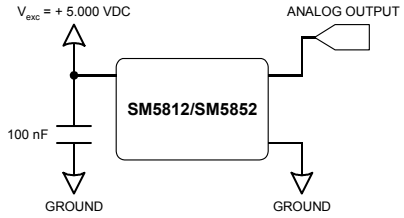
Pressure Range | **Pressure Type** | **Tube Length**

Notes
1. Absolute configuration only available in SM5822.
2. Single-ended configuration is for higher gain differential applications where differential pressure is **always** positive.
3. Other configurations available on large orders. Consult SMI for details.

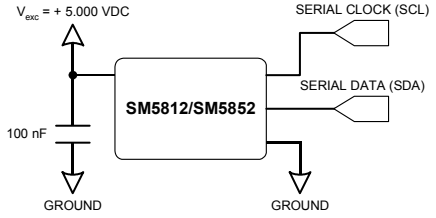
Full-Scale Pressure Ranges

SM5812	PSI	[kPa]	SM5852	PSI	[kPa]
005	5	[34.5]	001	0.15	[1.0]
015	15	[103.4]	003	0.30	[2.1]
030	30	[206.8]	008	0.80	[5.5]
060	60	[413.7]	015	1.50	[10.3]
100	100	[689.5]	030	3.00	[20.7]

Wiring Diagrams



Wiring diagram for analog output



Wiring diagram for digital output

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